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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/975,969 | 10/15/2001 | Takanori Suzuki | 107348-00151 | 1045 |
| 7590 | 08/30/2004 | | EXAMINER | |
| AREN'T FOX KINTNER PLOTKIN & KAHN, PLLC Suite 400 1050 Connecticut Avenue, N.W. Washington, DC 20036-5339 | | | CREPEAU, JONATHAN | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1746 | |

DATE MAILED: 08/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|---------------------|---------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/975,969 | SUZUKI ET AL. |
| | Examiner | Art Unit |
| | Jonathan S. Crepeau | 1746 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 June 2004.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-14 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,3,5,7,11 and 14 is/are rejected.

7) Claim(s) 2,4,6,8-10,12 and 13 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-8 and newly added claims 9-14. Claims 2, 4, 6, 8-10, 12, and 13 are objected to as containing allowable subject matter, and claims 1, 3, 5, 7, 11, and 14 remain rejected for substantially the reasons of record. Accordingly, this action is made final.

Claim Rejections - 35 USC § 103

2. Claims 1, 5, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold et al (U.S. Patent 6,195,999) in view of Tsutsumi et al (U.S. Patent 5,366,820).

Regarding claims 1 and 5, Arnold et al. teach a system comprising a fuel cell (12), a first means for storing hydrogen (22) having a first hydrogen storage material, and a second means for storing hydrogen (22') having a second hydrogen storage material (see Fig. 3). A catalytic combustor (42) heats the first and second hydrogen storage vessels via conduits 44 and 44' (see Fig. 3; col. 3, line 63). Regarding claims 1, 5, 11, and 14, the first and second hydrogen storage vessels supply hydrogen to the catalytic combustor via conduit 16, the fuel cell, and then conduit 19 (see Fig. 3). Waste heat from the fuel cell is also used to heat the hydrogen storage vessels via conduit 32 (see Fig. 3).

The reference does not expressly teach that the second hydrogen absorbing material has a hydrogen release temperature that is lower than that of the first hydrogen absorbing material, as recited in claims 1 and 5.

Tsutsumi et al. is directed to a fuel cell system having two hydrogen storage devices (65, 66) (see Fig. 13). In column 13, line 53, the reference teaches that the first device (66) contains an alloy which desorbs hydrogen at a higher temperature than the alloy of the second device (65).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Tsutsumi et al. to use alloys having different hydrogen desorption temperatures in the system of Arnold et al. In column 5, line 1, Tsutsumi et al. teach that “[i]n the above construction, since the hydrogen gas supply is smooth from the start, the fuel cell system is operated smoothly from the start.” Thus, the artisan would be motivated to use alloys having different desorption temperatures in the system of Arnold et al. in hopes of smoothly starting the fuel cell.

3. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold et al. in view of Tsutsumi et al. as applied to claims 1, 5, 11, and 14 above, and further in view of Snow et al (U.S. Patent 6,589,312).

Arnold et al. do not expressly teach that the first hydrogen absorbing material is an Mg system hydrogen storage alloy, as recited in claims 3 and 7.

Snow et al. is directed to nanoparticles for hydrogen storage (see abstract). In column 6, line 16, the reference teaches that Mg₂Ni, Mg₂Cu, and Mg materials may be used.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Snow et al. to use Mg-based alloys in the hydrogen storage devices of Arnold et al. In column 5, line 41, Snow et al. teach that “[m]agnesium hydrides are popular because magnesium is a relatively cheap and abundant metal and can absorb large amounts of hydrogen for its weight.” Accordingly, the artisan would be motivated to use Mg-based alloys in the hydrogen storage devices of Arnold et al.

Response to Arguments

4. Applicant's arguments filed June 9, 2004 have been fully considered but they are not persuasive. Applicants state that Arnold et al. heat the tanks at different times and that “it would not have been obvious to combine the teachings of Arnold et al. with teachings directed to heating two tanks at the same time.” Thus, Applicants characterize the secondary reference (Tsutsumi et al.) as teaching that its two tanks are heated at the same time. However, it is submitted that Tsutsumi et al. do not expressly disclose that the tanks are heated at the same time. In column 13, line 59, the reference teaches the following:

At the start of the system, the fuel gas supply valve 67 is opened to desorb the hydrogen gas from the first hydrogen storing device 65 and to supply the hydrogen gas to the anode 22, whereby power generation is started. The temperature of the hydrogen absorbing

Further, the reference teaches at column 14, line 3:

During the steady-state operation, the hydrogen absorbing alloy in the hydrogen storing device 66 exchanges heat with the combustion gas through heat exchanger 70, whereby the temperature of the hydrogen absorbing alloy is gradually raised. When the inner pressure of the hydrogen storing device 66 exceeds that of the hydrogen storing device 65, the fuel gas supply valve 68 is opened. In this way, the hydrogen gas is supplied from the hydrogen absorbing alloy in the hydrogen storing device 66 to the anode 22. Such hydro-

Thus, it is seen that device 65 operates first, at startup, and device 66 operates thereafter, during steady-state operation. As such, it is believed that the disclosure of Tsutsumi is not limited to heating two tanks "at the same time," as asserted by Applicants.

Furthermore, Applicants assert that "the present claims require an apparatus or system that heats two tanks at the same time." However, the claims do not contain an explicit recitation of such, and, as the claims are directed to apparatuses, only require tanks having the *capability* of being operated at the same time. As such, this assertion is also not persuasive.

Allowable Subject Matter

5. Claims 2, 4, 6, 8-10, 12, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

The reasons for allowance of claims 2 and 6 were given in the previous Office action and remain applicable herein.

Regarding claims 9, 10, 12, and 13, Arnold does not teach or fairly suggest that waste heat from the fuel cell is *not* supplied to the first tank, or that the fuel cell receives hydrogen *only* from the second tank. As such, claims 9, 10, 12, and 13 contain allowable subject matter.

Conclusion

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

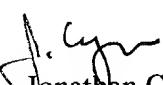
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Crepeau
Patent Examiner
Art Unit 1746
August 27, 2004